In re Patent Application of:
OCKENFUSS ET AL.
Serial No. **10/004,142**
Filed: **NOVEMBER 14, 2001**

IN THE CLAIMS

1. (previously amended, previously withdrawn) A process for making a multilayer interference filter assembly comprising the steps of:

   a) providing a first substrate,

   b) depositing a removable multilayer interference filter over said first substrate,

   c) removing the multilayer interference filter from the first substrate to form a free standing filter;

   d) attaching the free standing filter to a second substrate having a coefficient of thermal expansion enabling the second substrate to apply a stress to the free standing filter for at least partially compensating for a shift in center wavelength over an operating temperature range.

2. (previously amended, previously withdrawn) The process of claim 1 wherein the second substrate is an annular frame, whereby the free standing filter spans an opening in the annular frame.

3. (previously amended, previously withdrawn) The process of claim 1 wherein the coefficient of thermal expansion of the second substrate is higher than that of the free standing filter, whereby the second substrate stretches the free standing filter at temperatures at a high end of the operating temperature range.

4. (previously amended, previously withdrawn) The process of claim 1 wherein a release means is provided before depositing said removable multi-layer interference filter.

5. (previously amended, previously withdrawn) The process of claim 4 wherein the release means is a release layer selected from the group consisting of: organic photoresist materials soluble in organic solvents water-soluble salts, water-soluble polymers, metals, and metal compounds.

6. (previously amended, previously withdrawn) The process of claim 5 further comprising a step of depositing a protective layer onto said release layer.

7. (previously amended, previously withdrawn) The process of claim 4 wherein the release means is a release layer, said release layer being deposited over the first substrate in a discrete pattern whereby each free standing multilayer interference filter is released from the first substrate with lateral dimensions corresponding to the discrete pattern.

8. (previously amended, previously withdrawn) The process of claim 1 further comprising the removal of a portion of the multilayer interference filter in discrete patterns prior to release from said first substrate such that each free standing multilayer interference filter is released from the first substrate with lateral dimensions corresponding to the discrete pattern.

9. (previously amended, previously withdrawn) The process of claim 1, further comprising the step of attaching the free standing filter to a third substrate , wherein the third substrate has a coefficient of thermal expansion enabling the third substrate to apply a stress to the free standing filter for at least partially compensating for a shift in center wavelength over an operating temperature range..

10. (previously amended, previously withdrawn) The process of claim 9 wherein the second and third substrates are annular, whereby the free-standing filter spans openings in the second and third substrates.

11. (previously cancelled)

12. (previously amended, previously withdrawn) The process of claim 1, wherein step b includes:

i) introducing the first substrate into a vacuum deposition chamber,

ii) reducing the pressure in said vacuum deposition chamber,

iii) providing a release treatment to said first substrate,

iv) depositing a protective layer onto said release treated substrate,

v) restoring the pressure in the vacuum deposition chamber,

vi) reintroducing the first substrate to the vacuum deposition chamber,

vii) depositing a multilayer interference filter having an initial net stress over the protective layer.

13. (previously amended, previously withdrawn) The process of claim 2, wherein the annular frame comprises a metal, and the coefficient of thermal expansion of the annular frame is greater than that of the free standing filter.

14. (previously amended, previously withdrawn) The process of claim 13, wherein the annular frame comprises stainless steel having a coefficient of thermal expansion of between 103 x 10^{-7}/°K and 179 x 10^{-7}/°K.

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15. (previously amended, previously withdrawn) The process of claim 10, wherein the second and third substrates comprise metal, each having coefficients of thermal expansion greater than that of the free standing filter

16. - 21. (previously cancelled)

22. (currently amended) An optical filter assembly comprising:

a) ~~e)~~ a first frame member having a first planar surface that substantially surrounds a central opening therein, the first frame member having a first coefficient of thermal expansion, and

b) ~~f)~~ a multilayer thin-film interference filter, originally formed on a substrate and released therefrom forming a freestanding filter to eliminate stresses therebetween, having a first surface for passing light therethrough attached to the planar surface of said first frame member to define an unobstructed optical aperture through said multilayer interference filter, the multilayer interference filter having a second coefficient of thermal expansion smaller than the first coefficient of thermal expansion,

whereby the frame member applies a stress to the multilayer interference filter during changes in temperature, thereby reducing a shift in the center wavelength transmitted by the multilayer interference filter.

23. (previously amended) An optical filter assembly according to claim 22, further comprising a second frame member with a central opening therethrough attached to a second surface of said multilayer interference filter, wherein the optical

aperture through said multilayer interference filter is substantially unobstructed.

24. (previously amended) An optical filter assembly according to claim 23, wherein the second frame member and the first frame member are annular.

25. (previously amended) An optical filter assembly according to claim 23, wherein the first and second frame members are comprised of stainless steel material.

26. (previously amended) An optical filter assembly according to claim 23, wherein the first and second frame members are formed from a material having a coefficient of thermal expansion of between 103 x 10^{-7}/°K and 179 x 10^{-7}/°K.

27. (previously cancelled)

28. (previously cancelled)

29. (previously added) An optical filter assembly according to claim 22, wherein the first frame member is annular.

30. (previously added) An optical filter assembly according to claim 22, wherein the first frame member is comprised of metal.

31. (previously added) An optical filter assembly according to claim 22, wherein the first frame member is comprised of stainless steel.

32. (previously added) An optical filter assembly according to claim 22, wherein the first frame member is formed from a material having a coefficient of thermal expansion of between 103 x 10^{-7}/°K and 179 x 10^{-7}/°K.